

Container With Combination Slide and Pivot Door

Field of the Invention

[0001] The present invention is generally related to containers for storing and transporting articles and more specifically to a container having a door that slides and pivots.

Background of the Invention

[0002] Containers, such as, for example, tool boxes and portable tool cabinets, are used to transport tools and related items. Some containers include a storage compartment accessible through a side opening in the container. One or more doors or similar closure panels may be mounted on the container and movable between closed and open positions to cover and uncover the opening.

[0003] Both pivoting (e.g., hinged) doors and sliding doors have been used to cover the side openings of containers. A pivotally mounted door can be pivoted away from the opening to completely uncover the opening to allow access to the storage compartment through the opening. Pivoting doors have several shortcomings, however. For example, pivoting doors usually require latches or similar devices to hold the door in its closed position. If a heavy object stored within the storage compartment falls against the inside of the closed door during transport of the container, a pivoting door may accidentally open unless the door is securely latched in its closed position. When a single pivoting door is used to close the opening, the door is at least as wide as the opening. Therefore, a relatively large amount of space around the container must be clear of obstructions to allow room for the door to swing from its closed position to its open-most position (which may involve 180 degrees of pivotal door movement).

[0004] Sliding doors are sometimes used for covering and uncovering the side opening. The sliding doors are typically comprised of a pair of panels that are each slidingly mounted in a respective set of tracks that are mounted (transversely) across the opening. When the panels are in their closed positions, they are generally on opposite sides of the opening so that each panel covers a portion

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(approximately one-half, for example) of the opening. When the sliding doors are closed and the container is tilted during transport thereby causing a heavy article to fall against the inside of the doors, the doors generally do not open because they are not mounted to move outwardly from the opening. To access the storage compartment, one or the other panel is moved to the opposite side of the opening so that it is in lapped (or side by side) relation with the other panel. When sliding doors are used to cover the opening, however, only approximately one-half of the opening can be exposed at any particular time.

Summary of the Invention

[0005] A container structure is provided having an internal storage compartment and an opening for accessing the storage compartment. A sliding panel and a pivoting panel are operable to cover and uncover the opening. The pivoting panel is pivotable between a closed position covering a first portion of the opening and an open position. The sliding panel is slidable between a closed position covering a second portion of the opening adjacent the first portion and an intermediate open position disposed in lapped relation with the pivoting panel when the pivoting panel is in the closed position thereof so as to provide access to the compartment through the second portion. The sliding panel is pivotable, when in the intermediate open position thereof, together with the pivoting panel into a fully open position to provide access to both the first and second portions of the opening.

[0006] Other aspects, features, and advantages of the present invention will become apparent from the following detailed description of the illustrative embodiment, the accompanying drawings, and the appended claims.

Brief Description of the Drawings

[0007] FIGS. 1-3 show perspective views of a container structure of a container and showing a cover thereof in various positions;

[0008] FIG. 4 is another perspective view of the container structure;

[0009] FIG. 5 is perspective view of the container showing a pair of wheels of the container in exploded view;

[00010] FIG. 6 is a perspective view of the container structure with portions thereof removed and not shown to show the cover in its closed position;

[00011] FIG. 7 is an enlarged view of a portion of the container structure as indicated in FIG. 6;

[00012] FIG. 8 is a view similar to FIG. 6 except showing a sliding panel of the cover positioned between its closed position and its intermediate open position;

[00013] FIG. 9 is a view similar to FIG. 6 except showing the sliding panel in another position;

[00014] FIG. 10 is a cross sectional perspective view through the line 10-10 as indicated in FIG. 9;

[00015] FIG. 11 is a view similar to FIG. 6 except showing the sliding panel in its intermediate open position;

[00016] FIG. 12 is a cross sectional perspective view taken generally through the area indicated by the line 12-12 in FIG. 11, except showing a pivoting panel of the cover pivoted outwardly of the position shown in FIG. 11; and

[00017] FIG. 13 is a cross sectional perspective view taken generally through the area indicated by the line 13-13 a in FIG. 11.

Detailed Description of the Invention

[00018] FIGS. 1-5 show a container 10 constructed according to the principles of the present invention. The container 10 may be employed as a tool container, but is not limited to such use. The container 10 includes a container structure 11 which generally includes side and back wall portions 12, 14, 16, respectively, and top and bottom wall portions 18, 20, respectively. The container structure 11 has an internal storage compartment 22 which may be used for storing tools, equipment or other items. The container structure 11 includes an opening 24 formed in a front side 26 of the container structure 11 for accessing the storage compartment 22.

[00019] A cover 28 is mounted on the container structure 11 and is operable to cover and uncover the opening 24 of the container structure 11. The cover 28 includes a sliding panel 30 and a pivoting panel 32. The pivoting panel 32 is constructed and arranged to pivot between a closed position covering a first portion of the opening 24 and an open position. The sliding panel 30 is constructed and arranged (1) to slide between a closed position covering a remaining second portion of the opening 24 beside the first portion of the opening and an intermediate open position disposed in cooperating lapped relation with the pivoting panel 32 when the pivoting panel 32 is in the closed position thereof so as to provide access to the second portion and (2) when in the intermediate open position to pivot with the pivoting panel 32 into a fully open position to provide access to both the first and second portions of the opening 24.

[00020] The opening 24 encompasses almost all of the front side 26 of the container structure 11. The cover 28 is constructed and arranged such that when the cover 28 is closed (see FIG. 1, for example), the sliding panel 30 and the pivoting panel 32 are in their closed positions and cooperate to cover respective portions of the opening 24. When the sliding panel 30 and the pivoting panel 32 are in their closed positions (see FIG. 1, for example), the sliding panel 30 is slidably engaged with the container structure 11 for sliding movement between its closed position (see FIG. 1, for example) in which it is positioned generally transversely outwardly of the pivoting panel 32 and an intermediate open position in which it is

in cooperating lapped relation with the pivoting panel 32. The pivoting panel 32 and the sliding panel 30 are operatively interconnected with one another and with the container structure 11 such that the pivoting panel 32 is prevented from pivoting out of its closed position until the sliding panel 30 is moved into its intermediate open position, and such that when the sliding panel 30 is in its intermediate open position, it is disengaged from the container structure 11 and pivots with the pivoting panel 32 when the pivoting panel 32 pivots from its closed position to a fully open position to expose the entire opening 24.

[00021] The container structure 11 may be constructed of a plastic material (such as a molded plastic), a metal material, or any other material or a combination of materials of suitable strength. A handle 34 (shown in FIG. 1 only) is pivotally mounted in a recess 36 formed in the top 18 of the container structure 11 for pivotal movement between extended and retracted positions. When the handle 34 is extended, it extends upwardly out of the recess 36 so that the handle 34 can be easily grasped to lift and carry the container structure 11. When the handle 34 is retracted, it is disposed within the recess 36 and is substantially flush with a top surface 38 of the top wall portion 18. A raised structure 40 is formed on the top surface 38 and forms an enclosed area on the top surface 38. The raised structure 40 may be used to help retain an object (such as a toolbox, for example) on the top surface 18, particularly when the container structure 11 is tilted and being moved using a pair of wheels described below. The container structure 11 may optionally include a lid in the top thereof, for example, that opens and closes to provide additional access to the storage compartment. The container structure may also include elastic straps or any other appropriate structures to tie or hold an object on the top surface of the container structure 11 during transport of the container 10.

[00022] The back 16 of the container structure 11 may optionally include structure for mounting a pair of wheels 42 and an axle 44 (shown in FIG. 5 only) on the container structure 11 and for receiving an adjustable handle assembly 46 (shown in FIG. 5 only) that can be used to move the container 10 using the wheels 42. The back 26 of the container structure 11 includes an axle housing 48 that is constructed to receive the axle 44 therein for rotational movement with

respect to the container structure 11. The axle 44 may be constructed of a metal material such as a steel or any other material of suitable strength. The wheels 42 may be of molded plastic construction or any other suitable construction and may be fixedly secured to respective ends of the axle 44.

[00023] The handle assembly 46 is generally U-shaped and includes a pair of leg portions 50, 51 that extend downwardly from opposite ends of a central handle portion 52. The leg portions 50, 51 are telescopically received within tubular members 53, 55 that are fixedly mounted on the back of the container structure 11 between respective lower openings 54, 56 and respective apertures 58, 60 formed on the back of the container structure 11. The leg portions 50, 51 of the handle assembly 46 are telescopically movable in and out of the tubular members 53, 55 and are releasably lockable in various positions of adjustment with respect to the tubular members 53, 55 so that the handle portion 52 can be releasably locked in a range of positions of adjustment between a retracted handle position and an extended handle position. The height of the handle portion 52 can therefore be adjusted by each worker so that it is positioned at a convenient height to be grasped by that particular worker.

[00024] Controls 61, 63 are operatively connected to respective leg portions 50, 51 of the handle assembly 46 and to the tubular members 53, 55 to lock and release an associated one of the legs 50, 51 for telescopic movement thereof with respect to the associated tubular member 53, 55. Each control 61, 63 may control the movement of a spring biased pin, for example, that is biased into its locking position and is movable into its releasing position by actuating a respective control 61, 63. When each pin is in its locking position, it extends through aligned openings in the associated leg 50/tubular member 53 pair or the leg 51/tubular member 55 pair. Some of the openings 67 in the leg portions 50, 51 are shown in FIG. 5, but the pair of openings in each of the non-moving tubular members 53, 55 are not shown. In its releasing position, each pin is disengaged from the aligned openings to allow movement the legs 50, 51 with respect to the tubular members 53, 55.

[00025] The container 10 is constructed and arranged such that when a

bottom surface (not shown) of the bottom wall portion 20 of the container structure 11 is resting on a level ground surface, the container structure 11 is supported thereon in a generally upright position (see FIG. 1, for example) and the wheels 42 are spaced upwardly from, and out of contact with, the ground.

[00026] To move the container 10 using the wheels 42, the worker may adjust the handle assembly 46 to the height desired, grasps the handle portion 52 and tilts the container 10 using the handle assembly 46 until the wheels 42 are in contact with the ground and the container structure 11 is out of contact with the ground and supported by the wheels 42. The worker can then roll the container 10 along the ground by pushing or pulling on the handle portion 52. A pair of fender-like structures 62 extend outwardly from the sides 12, 14 of the container structure 11 and partially enclose the wheels 42. The fender structures 62 protect the wheels and also help prevent contact with the wheels 42.

[00027] FIGS. 6, 8, 9, and 11 show views of the container 10 with portions of the container structure 11 thereof removed and not shown to more clearly show the structure and operation of the cover 28. The pivoting panel 32 is pivotally mounted to the container structure 11 for pivotal movement between a closed position (see FIG. 11, for example) and a fully open position (not shown, but FIGS. 3 and 4 show the pivoting panel 32 pivoted between its closed position and its fully opened position) in which the pivoting panel 32 is pivoted in its opening direction through the full range of its movement. The pivoting panel 32 may be constructed to be pivoted through a range of 180 degrees or more, for example, from its closed position to its fully open position.

[00028] The pivotal mounting of the pivoting panel 32 can be understood from FIG. 11, for example. The container structure 11 includes a vertically extending support structure 64 having mounting structure in the form of a projection 66 at each opposite end thereof for rigidly mounting the support structure 64 to the container 10. Each projection 66 is secured within an opening (not shown) formed in the container structure 11. An aperture 69 is provided near each end of the support structure 64 (only the lower aperture is shown in the figures) for pivotally mounting the pivoting panel 32 to the support structure 64. More

specifically, the pivoting panel 32 includes a pair of upper and lower arm structures 68, 70 and a panel member 82 mounted therebetween. The pair of upper and lower arm structures 68, 70 of the pivoting panel 32 are pivotally mounted on and extend generally horizontally outwardly from the vertically extending support structure 64. The arm structures 68, 70 are of generally similar construction and are pivotally mounted to the support structure 64 in substantially the same manner. Portions of the arm structure 70 are shown in enlarged view in the FIGS. 10 and 12, for example, and the construction and pivotal mounting of arm structure 68 can be understood from an examination of the arm structure 70. As shown in FIG. 12, the arm structure 70 includes a cylindrical projection 71 formed on a flange 73. The cylindrical projection 71 pivotally engages the opening 69 to pivotally mount the arm structure 70 on the support structure 64.

[00029] As shown in FIG. 10, the arm structure 70 has a generally U-shaped cross-section comprising a vertically extending inside wall portion 72, a vertically extending outside wall portion 74, and a horizontal wall portion 76 integrally connected between lower ends of the wall portions 72, 74. The arm structure 70 further includes a vertically extending intermediate wall portion 78 extending integrally upwardly from the horizontal wall portion 76. A plurality of projecting structures 80 are integrally formed on a vertical face of the inner wall portion 72 and extend toward the intermediate wall portion 78.

[00030] The panel member 82 is fixedly secured between the inside wall portion 72 and the intermediate wall portion 78. More specifically, a lower edge portion of the panel member 82 is secured to a vertical face of the intermediate wall portion 78 and to the projecting structures 80 formed on the inner wall portion 72 (using an adhesive, fasteners, welding or any other appropriate method). A vertical end wall portion 81 (see FIG. 7, for example) extends between and interconnects the wall portions 72, 78. The panel member 82 extends generally between the upper and lower arm structures 68, 70. The outside wall portion 74, the intermediate wall portion 78 and the portion of the horizontal wall 76 extending therebetween cooperate to form door track structure 84 on the lower arm structure 70 of the pivoting panel 32 to slidably engage and support a lower portion of the

edge of the panel member 86 and may be constructed to reinforce and rigidify the panel member 86. The side member 92 also includes a handle portion 102 that can be used to slide the sliding panel 30 between its intermediate open position and its closed position.

[00035] The container structure 11 includes a pair of upper and lower track structures 104, 106 that are operable to slidably engage and support the sliding panel 30 when the sliding panel 30 is mounted on and operatively connected to the container structure 11. The upper and lower track structures 104, 106 are of substantially identical construction to one another so only the lower track structure 106 is discussed in detail, but the discussion is applicable to the upper track structure 104 and the structure of the upper track structure 104 can be understood from the discussion of the track structure 106.

[00036] Each of the upper and lower track structures 104, 106 includes a pair of vertical walls 108, 110 (see FIG. 2, for example) that extend transversely generally from the side 14 of the container structure 11 to approximately the center of the opening 24. The upper and lower mounting members 88, 90 are of appropriate construction and size to be slidably received and supported within the track structures 83, 84 on the upper and lower mounting members 88, 90, respectively, of the pivoting panel 32 and within the upper and lower track structures 104, 106, respectively, formed on the container structure 11. The walls 108, 110 may be integrally formed on the container structure or, alternatively, may be formed on a separate track member which is fixed in place on a portion of the container structure 11. The track structures 104, 106 slidably engage and support the sliding panel 30 for movement in a transverse direction with respect to the opening 24 generally between its closed position (see FIG. 1, for example) toward its intermediate open position. When the sliding panel 30 is in its intermediate open position, it is disengaged from the track structures 104, 106 on the container structure and is supported and carried by the upper and lower arm structures 68, 70 of the pivoting panel 32. The upper and lower track structures 104, 106 are not shown in all views of the container structure 11 to more clearly illustrate the structure and operation of the container structure 11 and the cover 28.

Operation

[00037] When the cover 28 is in its closed position (see FIGS. 1 and 6, for example), the sliding panel 30 and the pivoting panel 32 are each in their closed positions (FIG. 1). The panels 30, 32 cooperate to cover the opening 24, with each panel 30, 32 covering a portion of the opening 24. The upper and lower door track structures 83, 84 on the pivoting panel 32 are each aligned with an associated upper and lower door track structure 104, 106 on the container structure 11 to that the track structures 83, 84, 104, 106 cooperate to form a pair of continuous straight door tracks that extend transversely across substantially the width of the opening 24. The track structures 83, 84, 104, 106 therefore cooperate when the cover 28 is in its closed position to form a continuous travel path for the sliding panel 30 to enable to sliding panel 30 to slide between its closed position and its intermediate open position.

[00038] When the sliding panel 30 is in its closed position, a portion of the sliding panel 30 is slidably engaged with and supported by the upper and lower track structures 104, 106 on the container structure 11 and a portion of the sliding panel 30 is slidably engaged with and supported by the upper and lower track structures 83, 84 on the upper and lower arm structures 68, 70 of the pivoting panel 32. Thus, when the sliding panel 30 of the example container 10 is in its closed position, a portion of the sliding panel 30 is in lapped relation with a portion of the pivoting panel 32 (but this is not required, however, and embodiments of the container structure are contemplated in which the sliding door may be constructed to be narrow enough so that it does not overlap the pivoting panel until the sliding panel is moved out of and away from its closed position).

[00039] The cover 28 can be operated and positioned to partially or completely uncover the opening, at the discretion of the worker. To partially uncover the opening 24, the worker may push or pull the handle 102 on the sliding panel 30 to slide the panel 30 transversely in its opening direction along the track structures 83, 84, 104, 106 across the opening 24. The sliding panel 30 can slide

position, the cover 28 is positioned away from the opening 24 so that the opening 24 is completely uncovered to provide the worker with access to the storage compartment 26 of the container structure 11 through all portions of the opening 24.

[00043] The example container 10 is constructed such that the pivoting panel 32 is prevented from pivoting between its closed and open positions until the sliding panel 30 is in the intermediate open position (but this is not required by the invention). More particularly, in the example container 10, the sliding panel 30 includes structure constructed and arranged to prevent the pivoting panel 32 from pivoting away from its closed position toward and into its open position until the sliding panel 30 is moved into the intermediate open position.

[00044] In the example embodiment, this operation occurs because the sliding panel is mounted on the outside of the pivoting panel 32 so that the sliding panel 30 is positioned in the path of opening movement of the pivoting panel 32 (but this arrangement of the panels is not required by the invention) and because the container 10 is constructed so that at least a portion of the sliding panel 30 overlaps at least a portion of the pivoting panel 32 throughout the range of movement of the sliding panel 30 (although this construction and operation are not required).

[00045] Because the sliding panel 30 is restricted to rectilinear movement in a transverse direction when the sliding panel 30 is interengaged with the track structures 106, 108 (because the sliding panel 30 is mounted between the wall structures 108, 110 on the container structure 11), the pivoting panel 32 is prevented from pivoting outwardly from its closed position in its opening direction until the sliding panel 32 is in the intermediate open position in which it is disengaged from the track structures 104, 106.

[00046] The cover 28 may include locking structure to releasably lock the sliding panel 30 in the intermediate open position (or carrying position) on the pivoting panel 32 (but this is not required by the invention). An example of such a locking arrangement can be understood from FIGS. 6-13. The wall portion 94 of the lower mounting member 90 is constructed of a flexible and resilient material (such as a molded plastic). As the sliding panel 30 moves towards its open position, the projecting structure 100 formed on the wall portion 94 of the lower mounting

member 90 comes into contact with a portion of the lower arm structure 70 on the pivoting panel 30 (see FIGS. 7 and 8, for example). Continued movement of the sliding panel 30 in its opening direction causes the wall 94 to flex (see FIGS. 9 and 10, for example) which moves the projecting structure 100 out of its equilibrium position to a retracted position. The wall portion 94 is shown in its flexed condition and the projecting structure 100 is shown in its retracted position in FIG. 10. The projecting structure 100 remains in its retracted position until the sliding panel 30 reaches the intermediate open position.

[00047] When the sliding panel is in the intermediate open position, the projection 100 is aligned with an opening 112 (or openings) formed in the lower arm structure 70 (see FIG. 12, for example). The wall portion 94 then returns resiliently to its equilibrium position, thereby moving the projecting structure 100 into the opening 112 so that a locking surface 101 (see FIG. 7, for example) on the projecting structure 100 moves into locking relation with a locking surface 103 (see FIG. 10, for example) on the opening 112 to releasably lock in the sliding panel 30 in the intermediate open position on the pivoting panel 32. This locking arrangement releasably locks the sliding panel 30 and the pivoting panel 32 to one another during, for example, the time that the pivoting panel 32 and the sliding panel 30 are positioned outwardly of the opening 24. A similar locking arrangement may be provided between an upper portion of the sliding panel 30 and the upper arm structure 68. It can be appreciated that the vertical wall portions 108, 110 that form the door track structures 104, 106 on the container structure 11 may be spaced apart from one another wide enough to allow the sliding panel 30 including the projection 100 to move through the track structures 104 and/or 106 without moving the projecting structure out of its equilibrium position and therefore without flexing the wall portion 94.

[00048] To close the cover 28, the pivoting panel 32 (along with the sliding panel 30 carried thereby) is pivoted in its closing direction to its closed position. As the pivoting panel 32 moves into its closed position, a releasing structure in the form of a raised structure 114 that may be integrally formed on the container structure 11 is received within the opening 112 and contacts the locking

structure 100. Continued pivoting movement of the panels 30, 32 in the closing direction causes the structure 114 to exert a force on the projection 100 which moves the projecting structure 100 out of locking engagement with the opening 112 to release the sliding panel 30 from locked engagement with the pivoting panel 32 to allow the sliding panel 30 to be moved out of the intermediate open position toward and into its closed position.

[00049] More specifically, as the worker closes the pivoting panel 32, the worker applies sufficient force to the pivoting panel 32 to move the locking structure 100 out of locking engagement with the opening 112 (as illustrated in FIG. 13, for example). The worker then slides with a sliding panel 30 closed. It can be appreciated that this locking arrangement has many advantages including preventing the sliding panel 30 from becoming disengaged from the pivoting panel 32 when the pivoting panel 32 is positioned in the fully open position, for example.

[00050] It can also be appreciated that the cover 28 has many advantages. For example, this arrangement allows the opening 24 to be completely uncovered to allow complete access to the storage compartment. This arrangement also allows prevents the cover 28 from being accidentally opened when the cover 28 is closed and, for example, a heavy object falls against the inside of the cover 28. More specifically, the sliding panel 30 is securely held against the opening 24 by the track structures 104, 106 and thereby prevented from moving outwardly from the opening by virtue of this interengagement with the track structures 104, 106. The sliding panel 30 is also positioned (as long as it is not in the intermediate open position) to prevent the pivoting panel 32 from pivoting in its opening direction because it at least partially overlaps the pivoting panel 32 and is disposed on the side of the pivoting panel 32 towards which the pivoting panel opens. Because the panels 30, 32 are lapped when they pivot outwardly, the cover requires a relatively short pivoting radius so that the cover 28 can be pivoted open and closed in relatively tight spaces.

[00051] Alternative constructions of the container, including the cover, are contemplated and within the scope of the invention. For example, although the sliding panel and the pivoting panel of the example container structure

are operatively connected to one another such that the pivoting panel cannot be pivoted open until the sliding panel is in the intermediate open position, this is not required by the invention. For example, the cover could be constructed such that the pivoting panel alone could be pivoted between its open and closed positions while the sliding panel is in its closed position and so that the pivoting panel could be pivoted open together with the sliding panel carried thereon so that the pivotal movement carries the two panels together to the fully opened position of the cover, at the discretion of the worker.

[00052] As another alternative, the cover could be constructed such that the sliding panel is mounted on the inside of the pivoting panel (i.e., so that the sliding panel is mounted on the storage compartment side of the pivoting panel so that the pivoting panel pivots away from the plane of sliding movement of the sliding panel). When this arrangement is utilized, the pivoting panel may include structure on the inside thereof (such as structure that forms track structures similar to the track structures formed on the outside of the pivoting panel 32 in the example embodiment of the container 10, for example) constructed to slidably engage and to engage and carry the sliding panel. This engagement could be such that it prevents the pivoting panel from opening until the sliding panel 30 is in its intermediate open position. It can also be understood that although the cover is illustrated operatively mounted on a side opening of the container structure, this is not required and is not intended to be limiting. Accordingly, the opening could be on any wall surface of a container structure (such as an upwardly or downwardly facing surface, for example) and can have any orientation.

[00053] While the invention has been disclosed and described with reference with a limited number of embodiments, it will be apparent that variations and modifications may be made thereto without departure from the spirit and scope of the invention and various other modifications may occur to those skilled in the art. Therefore, the following claim is intended to cover modifications, variations, and equivalents thereof.